What we claims:

1   1.   A storage subsystem which is connected to a host
2   computer through a communication line, comprising
3   an interface which is used for connecting to said
4   communication line, wherein,
5   said interface comprises a first filter which judges,
6   on the occasion of having received communication packets
7   from said communication line, whether there is a
8   communication packet with a predetermined format for use
9   in an access to said storage subsystem, among the
10 communication packets.

1   2.   The storage subsystem according to Claim 1,
2   wherein,
3   said interface further comprises a second filter which
4   receives the communication packet judged to be for said access
5   in said fist filter, and judges whether it is a communication
6   packet permitted to access to a storage area in said storage
7   subsystem and transmitted from said host computer or not.

1   3.   The storage subsystem according to Claim 2,
2   wherein,
3   in case that said host computer is permitted to access
4   to said storage subsystem, said interface further comprises
5   an access permission table having information which uniquely

6   specifies the host computer, and information which specifies

7   a storage area in said storage subsystem to which the host

8   computer is permitted to access, and

9   said second filter judges whether a communication

10   packet judged to be for use in said access is transmitted

11   from the host computer permitted to access or not, in

12   accordance with information stored in said access permission

13   table.

1   4.   The storage subsystem according to Claim 1,

2   wherein,

3   said interface further comprises

4   a traffic measuring and judging unit which measures

5   traffic of all communication packets received in the

6   interface, and traffic of a communication packet judged not

7   to be the packet with said format in said first filter,

8   respectively, and by using the both traffics, judges whether

9   a communication failure is generated or not, and

10   a communication failure alerting unit which alerts a

11   management server connected to said storage subsystem and

12   comprises a function of displaying information alerted, in

13   case that it is judged that a communication failure is

14   generated in said traffic measuring and judging unit.

1   5.   The storage subsystem according to Claim 4,

2   wherein,

3   said traffic measuring and judging unit further

4   measures traffic of a communication packet judged not to

5   be the communication packet transmitted from said host

6   computer which is permitted to access in said second filter,

7   and by using the traffic and said traffic of all communication

8   packets, further judges whether a communication failure is

9   generated or not.

1   6.   The storage subsystem according to Claim 5,

2   wherein,

3   said interface further comprises

4   a traffic log recording unit which records, as a traffic

5   log, communication information of a communication packet

6   judged not to be the communication packet with said format

7   in said first filter and a communication packet judged not

8   to be the communication packet transmitted from said host

9   computer permitted to access in the second filter.

1   7.   A management server connected to the storage

2   subsystem according to Claim 6, wherein,

3   an improper communication source analyzing unit which

4   refers to said traffic log, in case that it is alerted from

5   a communication failure alerting unit of said storage

6   subsystem that a communication failure is generated, and

7   searches a source of said communication packet causes the

8   communication failure.

1   8. The management server according to Claim 7, further

2 comprising,

3   a relay device control unit which controls, based on

4 information of a source searched in said improper

5 communication source analyzing unit, a relay device which

6 relays communication to said storage subsystem disposed on

7 said communication line so as to cut off communication from

8 the source.

1   9. A program in a computer mounted on a storage

2 subsystem connected to a host computer through a

3 communication line, functioned as

4   interface means which connects to said communication

5 line, and

6   first filtering means which judges, on the occasion

7 of having received communication packets from said

8 communication line through said interface means, whether

9 there is a communication packet with a predetermined format

10 for use in an access to said storage subsystem, among the

11 communication packets.

1   10. A program according to claim 9, further functioned

2 as

3   second filtering means which receives the

4 communication packet judged to be for said access in said

5 fist filtering means, and judges whether it is a communication

6   packet permitted to access to a storage area in said storage

7   subsystem and transmitted from said host computer or not.

1   11.   A program according to claim 9, further functioned

2   as

3   communication failure judging means which measures

4   traffic of all communication packets received in said

5   interface means, and traffic of a communication packet judged

6   not to be the packet with said format in said first filter,

7   respectively, and by using the both traffics, judges whether

8   a communication failure is generated or not, and

9   a communication failure alerting means which alerts

10 a management server connected to said storage subsystem and

11 comprises a function of displaying information alerted, in

12 case that it is judged that a communication failure is

13 generated in said communication failure judging means.

1   12.   A program in a computer mounted on a management

2   server which is connected to a storage subsystem, functioned

3   as

4   source searching means which refers to said traffic

5   log, in case that it is alerted from a communication failure

6   alerting unit of said storage subsystem that a communication

7   failure is generated, and searches a source of said

8   communication packet which causes the communication failure.

1   13. A program which has a computer, mounted on a

2 management server which is connected to a storage subsystem,

3 functioned as

4   source searching means which refers to said traffic

5 log, in case that it was alerted from a communication failure

6 alerting unit of said storage subsystem that a communication

7 failure is generated, and searches a source of said

8 communication packet which causes the communication failure,

9 and

10   relay device control means which controls, based on

11 information of a source searched in said source searching

12 means, a relay device which relays communication to said

13 storage subsystem disposed on said communication line for

14 receiving a communication packet so as to cut off

15 communication from the source.

1   14. A computer-readable recording medium in which the

2 program according to Claim 9 is recorded.

1   15. A storage system in which a storage subsystem,

2 a host computer, and a management server are connected by

3 a communication line, wherein,

4   said storage subsystem comprises an interface which

5 connects to said communication line, and

6   said interface comprises,

7   a first filter which judges, on the occasion of having

43

8 received communication packets from said communication line,

9 whether there is a communication packet with a predetermined

10 format for use in an access to said storage subsystem, among

11 the communication packets,

12 a second filter which receives the communication packet

13 judged to be for said access in said fist filter, and judges

14 whether it is a communication packet permitted to access

15 to a storage area in said storage subsystem and transmitted

16 from said host computer or not,

17 a traffic measuring and judging unit which measures

18 traffic of all communication packets received in the

19 interface, and traffic of a communication packet judged not

20 to be the packet with said format, respectively, and by using

21 the both traffics, judges whether a communication failure

22 is generated or not,

23 a communication failure alerting unit which alerts said

24 management server, in case that it is judged that a

25 communication failure is generated in said traffic measuring

26 and judging unit, and

27 a traffic log recording unit which records, as a traffic

28 log, communication information of a communication packet

29 judged not to be the communication packet with said format

30 in said first filter and a communication packet judged not

31 to be the communication packet transmitted from said host

32 computer permitted to access in the second filter, and

33 said management server comprises

34   a display device which displays the alert received from

35   said communication failure alerting unit,

36   an improper communication source analyzing unit which

37   refers to said traffic log, in case that it is alerted from

38   a communication failure alerting unit of said storage

39   subsystem that a communication failure is generated, and

40   searches a source of said communication packet which causes

41   the communication failure,

42   a relay device control unit which controls, based on

43   information of a source searched in said improper

44   communication source analyzing unit, a relay device which

45   relays communication to said storage subsystem disposed on

46   said communication line so as to cut off communication from

47   the source.

1   16. The storage system according to Claim 15, wherein,

2   in case that said host computer is permitted to access

3   to said storage subsystem, said interface further comprises

4   an access permission table having information which uniquely

5   specifies the host computer, and information which specifies

6   a storage area in said storage subsystem to which the host

7   computer is permitted to access, and

8   said second filter judges whether a communication

9   packet judged to be for use in said access, is transmitted

10   from the host computer permitted to access or not, in

11   accordance with information stored in said access permission

12   table.

1   17.   The storage system according to Claim 15, wherein,

2   said traffic measuring and judging unit further

3   measures traffic of a communication packet judged not to

4   be the communication packet transmitted from said host

5   computer permitted to access in said second filter, and by

6   using the traffic and said traffic of all communication

7   packets, further judges whether a communication failure is

8   generated or not.

1   18. The storage system according to Claim 17, wherein,

2   said traffic measuring and judging unit further

3   measures traffic of a communication packet judged to be the

4   communication packet transmitted from said host computer

5   permitted to access in said second filter, and by using the

6   traffic and said traffic of all communication packets, judges

7   whether a value of a ratio of traffic of a communication

8   packet transmitted from said host computer permitted to

9   access to traffic of all communication packets is less than

10   a predetermined value or not, and

11   said communication failure alerting unit alerts said

12   management server of the alert which indicates that second

13   communication failure is generated, in case that it is judged

14   that the value of the ratio is less than the predetermined

15   value in the traffic measuring and judging unit, and

16   said management server further comprises

17   a QoS condition designating unit which, in case of

18 having received the alert which indicates that the second

19 communication failure is generated from said communication

20 failure alerting unit, readjusts a network QoS between said

21 storage subsystem and said host computer, which has been

22 set up in advance by an administrator.

1   19. A communication control method in a storage system

2 in which a storage subsystem, a host computer, and a management

3 server are connected by a communication line, comprising

4 the steps of:

5   judging, when communication packets from said

6 communication line were received in said storage subsystem,

7 whether there is a communication packet with a predetermined

8 format for use in an access to said storage subsystem, among

9 the communication packets,

10   measuring traffic of all communication packets

11 received by said storage subsystem, and traffic of a

12 communication packet judged not to be the packet with said

13 predetermined format, respectively, and recording a traffic

14 log of a communication packet judged not to be the

15 communication packet with said format,

16   judging, by using said measured both traffics, whether

17 a communication failure is generated or not, and alerting

18 said management server, in case that it is judged that a

47

19 communication failure is generated,

20   referring to said traffic log, in case that the alert

21 that the communication failure is generated is received in

22 said management server from said storage subsystem, and

23 searching information of a source of said communication

24 packet which causes said communication failure, and

25   controlling, based on information of the searched

26 source, a relay device which relays communication to said

27 storage subsystem disposed on said communication line so

28 as to cut off communication from the source.

1   20. A storage system having a storage subsystem

2   connected to a host computer through a communication line,

3   and a management server connected to said storage subsystem,

4   wherein,

5   said storage subsystem comprises

6   an interface which connects to said communication line

7   and a maintenance terminal which maintains said storage

8   subsystem, and

9   said interface comprises

10   a first filter which judges, on the occasion of having

11 received communication packets from said communication line,

12 whether there is a communication packet with a predetermined

13 format for use in an access to said storage subsystem, among

14 the communication packets,

15   a second filter which receives the communication packet

16   judged to be for said access in said fist filter, and judges

17   whether it is a communication packet permitted to access

18   to a storage area in said storage subsystem and transmitted

19   from said host computer or not

20   a traffic measuring and judging unit which measures

21   traffic of all communication packets received in the

22   interface, and traffic of a communication packet judged not

23   to be said communication packet permitted to access in said

24   second filter, respectively, and calculates a value of a

25   ratio of the both traffics (communication ratio), and by

26   using the both traffics, judges whether a communication

27   failure is generated or not, and

28   a communication failure alerting unit which alerts said

29   maintenance terminal, in case that it is judged that a

30   communication failure is generated in said traffic measuring

31   and judging unit, of that failure is generated and said

32   communication ratio, and

33   said maintenance terminal comprises

34   a warning message reporting unit which generates, in

35   case that the alert of that a communication failure is

36   generated and said communication ratio is received from said

37   communication information and failure alerting unit, a

38   warning message in accordance with said alert, and outputs

39   it to said management server, and

40   said management server comprises:

41   an output device,

49

42   a failure information displaying unit which comprises

43   said output device displayed the warning message and said

44   communication ratio received from said warning message

45   reporting unit, and

46   a QoS condition designating unit which judges whether

47   said communication ratio is within a predetermined

48   permissible zone, and in case that it is judged to be outside

49   the permissible zone, adjusts a network QoS of a relay device

50   which relays communication to said storage subsystem

51   disposed on said communication line.